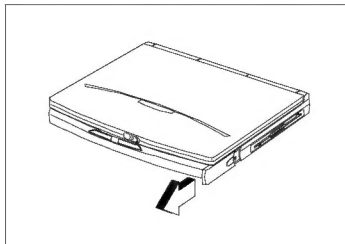


Operating on Battery Power

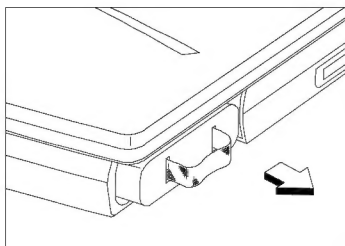
This chapter contains the information you need to know to operate the notebook on battery power.

2.1 Battery Pack

Whenever possible, use the AC adapter. The battery will come in handy when you travel or during a power failure. It is advisable to have an extra fully-charged battery pack available for backup. The battery pack is installed in the battery compartment. Before removing the battery pack, make sure the notebook power is off. Follow these steps to remove the battery.



1. Press the cover release and slide the cover out.



2. Pull out the battery using the cloth strip attached to the end of the battery pack.



Do not expose battery packs to temperatures below 0°C (32°F) or above 60°C (140°F). This may adversely affect the battery pack.



If the notebook is to be stored for more than two weeks, we suggest that you remove the battery pack. In suspend mode or power-off condition, the battery power (from a fully-charged battery pack) depletes in one month.

Battery Pack Characteristics

The battery pack has the following characteristics:

- *Battery pack self-discharge* Battery packs self-discharge slowly, which may result in a low battery power condition after being stored for weeks.
- *Memory effect* This is a phenomenon wherein charging finishes in one-third the normal charge time. This leaves the battery pack not fully charged. This situation can usually be improved by conditioning the battery pack twice a month. Please refer to section 2.3.2 for details on how to condition the battery pack.

2.2 Charging the Battery

Place the battery pack inside the battery compartment and plug the AC adapter into the notebook and an electrical outlet.

The adapter has three charging modes:

- Rapid mode

The system uses rapid charging when the notebook (with a battery pack installed) is turned off and a powered AC adapter is connected to it. In rapid mode, a fully depleted NiMH battery gets fully charged in approximately two hours.

- Charge-in-use mode

When the notebook is in use with the AC adapter, the notebook also charges the battery pack if one is installed. In charge-in-use mode, a fully depleted NiMH battery gets fully charged in approximately four and a half to six hours.

- Trickle mode

When the battery is fully charged, the adapter changes to trickle mode to maintain the battery charge level.

The battery indicator lights up when the battery is being charged and turns off when it is fully-charged or when the battery is not being charged.



If the notebook emits five beeps and then turns off (after the power-on self test), it means the battery pack does not have enough charge. Use the AC adapter instead, or recharge the battery pack.

2.3 Optimizing Battery Life

This section helps you get the most out of battery operation. Optimizing battery life prolongs the charge/recharge cycle and improves recharge efficiency.

2.3.1 Maximizing Battery Power

Follow these suggestions to maximize battery power:

- Purchase an extra battery pack
- Use the system utility ASTDK to reserve hard disk space for the zero-volt suspend function.
- Condition the battery pack to reduce the possibility of memory effect. Refer to section 2.3.2.
- Use the AC adapter whenever possible so that the battery is reserved for on-the-go computing.
- Disable the parallel and serial ports if no devices are connected to these ports. You can do this through Setup.
- Make use of the power-saving modes described in sections 2.4 and 2.5.
- Eject the PCMCIA card from the card slot when not in use, since the PCMCIA card draws extra power
- When using a network card, logout first before ejecting the card.
- Use the disk cache utility SMARTDRV (bundled with MS-DOS) or create a virtual disk (RAMDRIVE) to lessen the loading of the hard disk.
- Store the battery pack in a cool, dry place. The recommended storage temperature for battery packs ranges from 10°C to 30°C. The higher the storage temperature, the faster the battery pack self-discharges.

- The batteries can be recharged about 500 times when used as directed. Excessive rapid recharging decreases battery life.

2.3.2 Conditioning the Battery Pack

Conditioning the battery pack reduces the possibility of memory effect. We recommend that you condition the battery pack at least once every month, preferably twice a month.

Follow these steps to condition the battery pack:

1. Disconnect the AC adapter.
2. Turn on the notebook (with the battery pack installed).
3. Press m (during POST) to enter Setup.
4. Leave the machine turned on.

The battery pack begins to use up the battery. Once the notebook has used up all battery power, the notebook power turns off (the power indicator turns off). You can then connect the adapter to begin recharging the battery pack (the battery charging indicator lights up). Do not turn on the notebook until the battery has been fully charged.



For faster and automatic discharging and charging, you can use the optional external battery charger.

5. Repeat the conditioning process.

2.4 Power Management

This notebook has a built-in power management unit that monitors system activity. System activity refers to any activity involving one or more of the following devices: keyboard, mouse, diskette drive, hard disk drive, peripherals connected to the serial and parallel ports, and video memory. If no activity is detected for a specified period of time (called an inactivity time-out), the system switches to one of the power-saving modes to conserve energy. These power-saving modes are display standby mode, fixed disk standby, and system standby/suspend mode.



The Setup utility allows you to specify the inactivity time-out.

2.4.1 Display Standby Mode

Screen activity is determined by the keyboard, the built-in touchpad, and an external pointing device. If these devices are idle for the period specified by the Display Standby Timer, the display shuts off until you press a key or move the touchpad or external mouse.



We strongly recommend you to enable the Display Standby Timer with a shorter time interval to prolong your battery life.

“Automatic Dim” Feature

The notebook has a unique “automatic dim” power saving feature. When the notebook is using AC power and you disconnect the AC adapter from the notebook, the system “decides” whether or not to automatically dim the LCD backlight to save power.

If the LCD backlight is too bright, the system automatically adjusts it to a manageable level; otherwise, the level stays the same. If you want a brighter picture, you can then adjust the brightness and contrast level using hotkeys (-M¹).

If you reconnect AC power to the system, the system automatically adjusts the LCD backlight to its original level — the brightness and contrast level before disconnecting the AC adapter. If you adjusted the brightness and contrast level after disconnecting AC power, the level stays the same after you reconnect the AC adapter.

2.4.2 Fixed Disk Standby Mode

The hard disk drive enters the standby mode when there are no disk read/write operations within the period of time specified by the Fixed Disk Standby Timer. In the standby state, the power supplied to the hard disk drive is reduced to a minimum. The hard disk drive returns to normal once the system accesses it.

2.4.3 Suspend Mode

In suspend mode the system power shuts off. The notebook saves all system information onto the hard disk before it enters suspend mode. The notebook restores this information and resumes where you left off upon leaving suspend mode.

A necessary condition for the notebook to enter suspend mode is that the reserved space for saving system information on the hard disk must be larger than the combined system and video memory size. Under such conditions, the system standby/suspend button acts as the suspend button. See Appendix D for information on the ASTDK utility.

¹ After pressing this key combination, press -X and -Z to increase and decrease the current setting. Press -| to close the pop-up.

In this situation, there are four ways to enter suspend mode:

- Press the standby/suspend button ($\mathbf{Z}^2$)



If the notebook beeps but does not enter suspend mode after pressing the standby/suspend button, it means the operating system does not allow the notebook to enter the power saving mode.

- Set a value for the System Standby/Suspend Timer in Setup. If the waiting time specified by this time elapses without any system activity, the system goes into suspend mode
- Enable the Suspend upon Battery-low parameter in Setup. If a battery-low condition takes place, the notebook enters suspend mode in about three minutes. See section 2.6.
- Invoked by the operating system power saving modes

When the notebook enters suspend mode, the whole system does not consume any power.

To exit system suspend mode, press the power switch ($\mathbf{\text{P}}$).



Do not change any system devices when the notebook is in suspend mode.



If the notebook is connected to a LAN environment or has a current modem connection, it does not resume connection even after the notebook returns to normal operating mode.

2.4.4 System Standby Mode

The notebook consumes very low power in system standby mode. Data remain intact in the system memory.

The necessary condition for the notebook to enter system standby mode is that the reserved disk space size for saving system and video memory is insufficient so the notebook is unable to enter suspend mode.

In this situation, there are four ways to enter system standby mode:

- Press the standby/suspend button (Z^Z)



If the notebook beeps but does not enter system standby mode after pressing the standby/suspend button, it means the operating system does not allow the notebook to enter the power saving mode.

- Set a value for the System Standby/Suspend Timer in Setup. If the waiting time specified by this timer elapses without any system activity, the notebook goes into system standby mode.
- Enable the Suspend upon Battery-low parameter in Setup. If a battery-low condition takes place, the notebook enters system standby mode in about three minutes. See section 2.6.
- Invoked by the operating system power saving modes

The following signals indicate that the notebook is in system standby mode:

- The buzzer beeps (when you press the standby/suspend button)
- The standby mode indicator (Z^Z) flashes



Unstored data is lost when you turn off the notebook power in system standby mode.

To leave system standby mode and return to normal mode, press the standby/suspend button (**Z**). If an incoming modem event occurs, the system returns to normal mode.



If the notebook is connected to a LAN environment or has a current modem connection, it may not resume connection after the notebook returns to normal operating mode.

2.5 Advanced Power Management (APM)

This notebook supports the APM standard designed to further reduce system power consumption. APM is a power-management approach defined jointly by Microsoft and Intel. An increasing number of software supports APM to take advantage of power saving features and allows greater system availability without degrading performance.

DOS

You can use the APM feature under the DOS environment by including the POWER.EXE command in the CONFIG.SYS file. See the MS-DOS manual for instructions on how to edit the CONFIG.SYS file. For more information about APM, type the following at the DOS prompt:

```
HELP POWER.EXE  e
```

Windows 3.x

To enable APM under the Windows environment, run Windows Setup and select `MS-DOS System with APM` as your computer type in the System Information menu. Refer to the Windows user's guide for details.

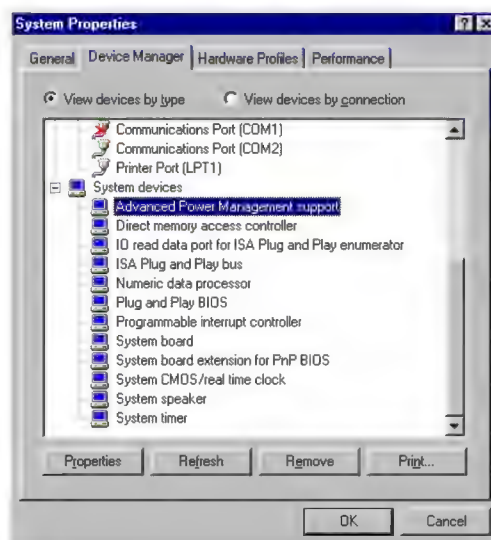
Windows 95

To enable APM under Windows 95, follow these steps:

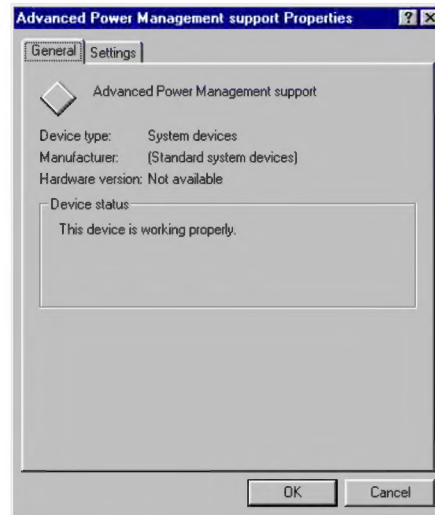
1. Select the Start button and click on Settings....
2. Select the Control Panel item. The Control Panel window appears.



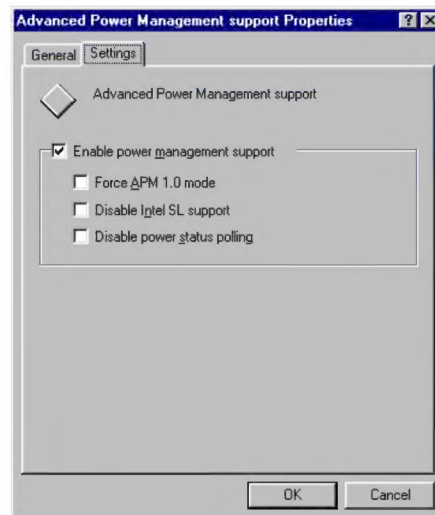
3. Double-click on the System icon in the Control Panel window. The System Properties dialog box appears.
4. Select the Device Manager tab and double-click on System devices.



5. Double-click on Advanced Power Management support. Its property dialog box appears.



If the device is not working properly, select the Settings tab and verify if the check box for enabling power management support is selected.



Refer to the Windows 95 user's guide for details.



1. *If you enable the Power Management Mode parameter in Setup without installing the APM under DOS, Windows or Windows 95, the system time and date do not display the correct settings after the notebook returns to normal operation from system standby or suspend mode. To update the time and date, reboot the notebook. Enable APM to avoid this problem.*
2. *You can not change some power management parameter in the Setup screen after APM is enabled because it is controlled by APM.*



Advanced Power Management greatly prolongs battery life. Use APM whenever possible.

2.6 Battery-low Warning

You never have to worry about battery power as long as you are using the AC adapter. However, when you operate the notebook on battery power, pay extra attention to the warning beeps and the power indicator. The power indicator flashes when the battery power is low.

The following signals indicate a battery-low condition:

- The buzzer generates four short beeps every minute, if you enabled the Battery-low Warning Beep parameter in Setup
- The power indicator flashes at regular intervals until battery power is depleted

When you receive a battery-low warning, you have around three minutes¹ to save your work. If you do not connect the AC adapter within this period, the notebook enters suspend mode if the Standby/Suspend upon Battery-low parameter in Setup is enabled and the following conditions exist:

- There is enough battery power left to save system information onto the hard disk.
- The reserved disk space for saving these data is larger than the combined system and video memory size.

Otherwise, the notebook enters system standby mode.



Connect the AC adapter as soon as possible. Data is lost when notebook power is cut off during system standby mode.

¹ You may have less than three minutes if your battery has not been fully charged.

Table 2-1 lists the recommended course of action when you encounter a battery-low condition.

Table 2-1 Course of Action for Battery-low Condition

Situation	Recommended Action
AC adapter and power outlet available	1. Connect the AC adapter to the system. 2. Save all necessary files. 3. Resume work. 4. Turn off the system if you wish to recharge the battery rapidly.
An extra fully-charged battery pack available	1. Save all necessary files. 2. Exit the application. 3. Turn off the system. 4. Replace the battery pack. 5. Turn on the system and resume work. or 1. Enter 0V suspend. 2. Replace battery pack. 3. Resume from 0V suspend.
AC adapter or power outlet or fully-charged battery pack not available	1. Save all necessary files. 2. Exit the application. 3. Turn off the system.